



Excellence in Energy Management

Presenters

Terry Taylor, Facilities Supervisor

Terry_taylor@gbsd.gresham.k12.or.us

Dave Cone, Assistant Facility Supervisor

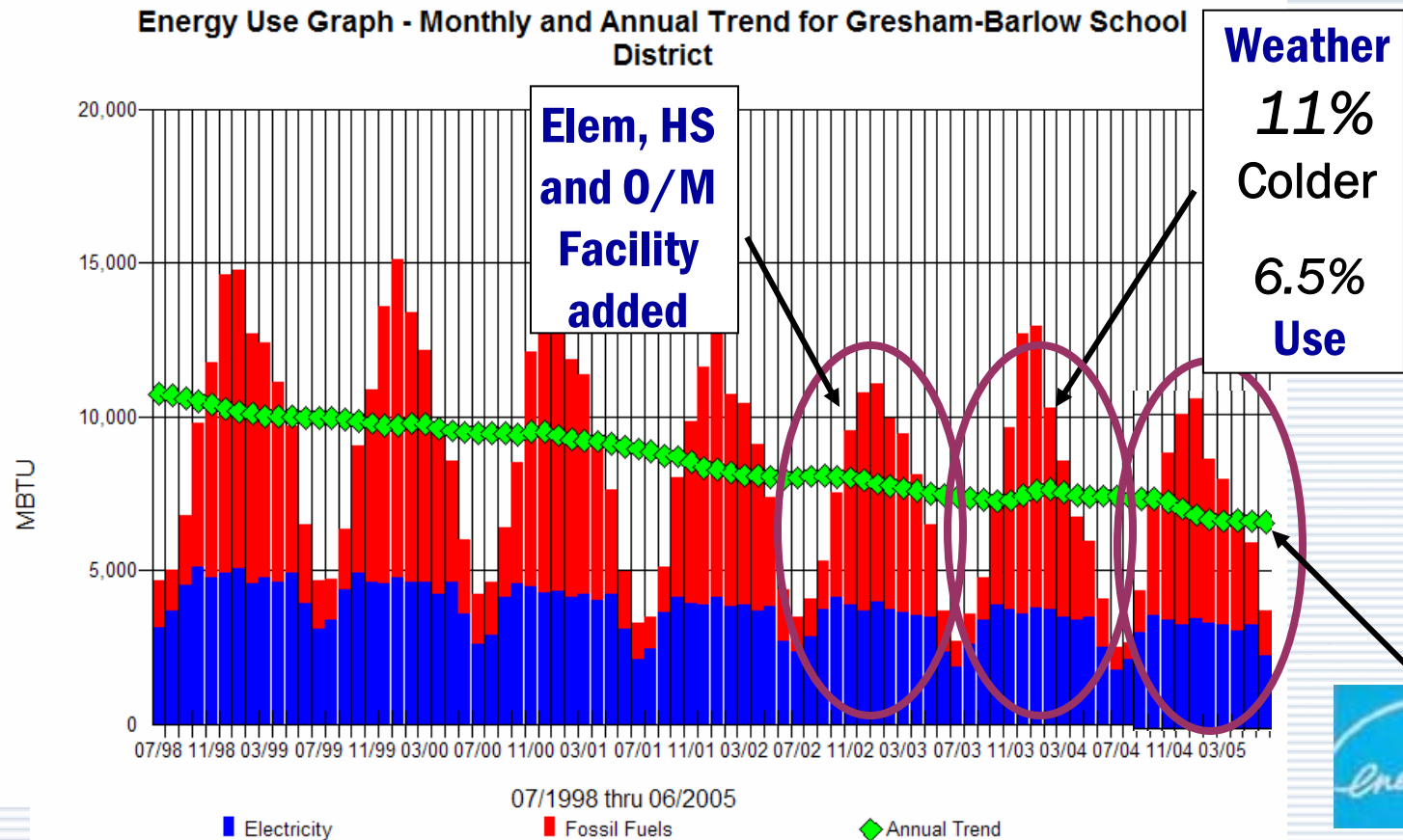
Dave_cone@gbsd.gresham.k12.or.us

503-667-6497

Energy Consumption Trend over the Last Seven Years

Energy Policy: Determines the Culture

Capital Improvements: Gresham High School

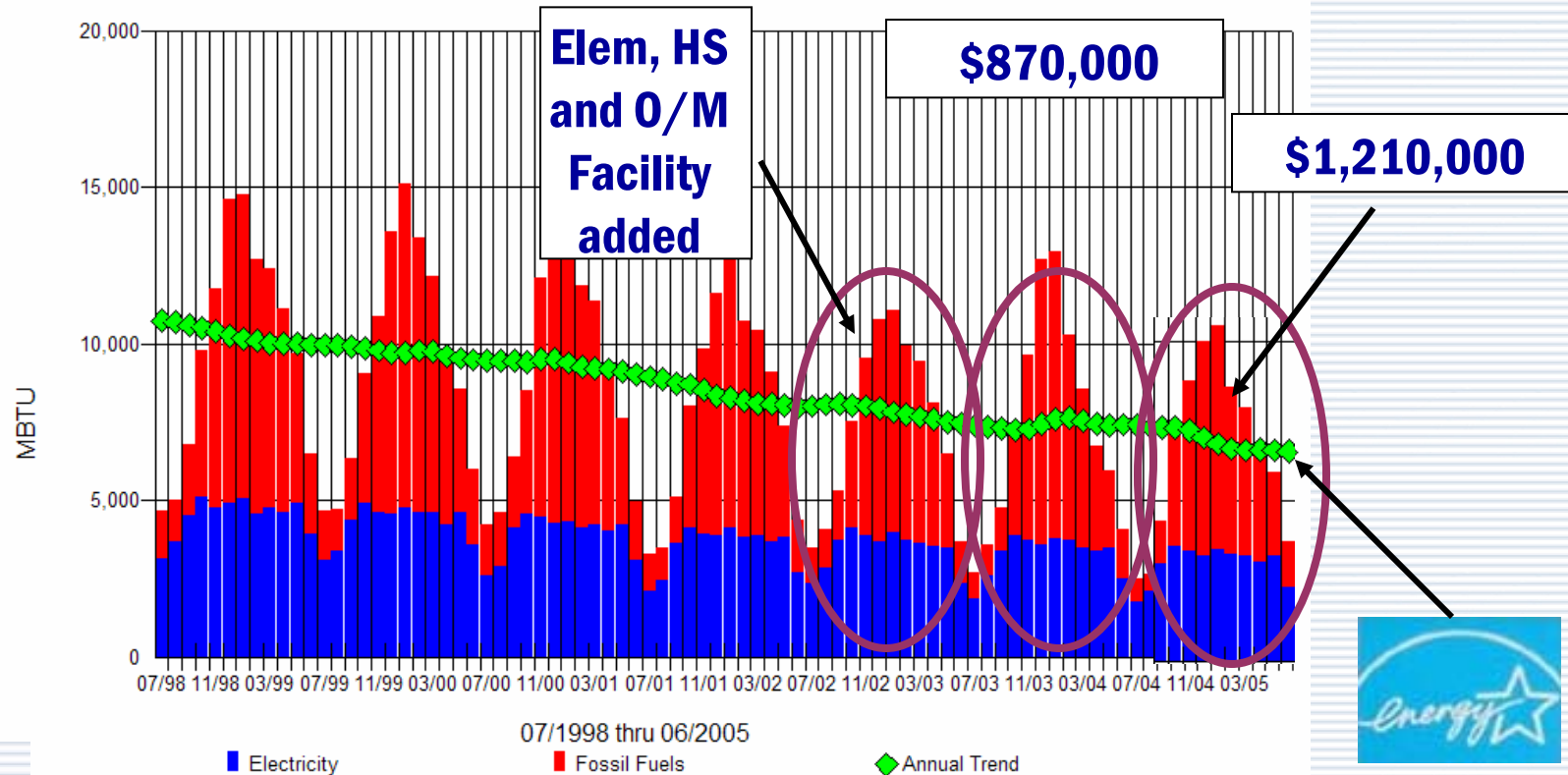


Operation of Schools:
Building Performance Plans
Incentive Program

Better Information Systems:
Direct Digital Control (DDC) Systems
Interval Data

Energy Consumption Trend over the Last Seven Years

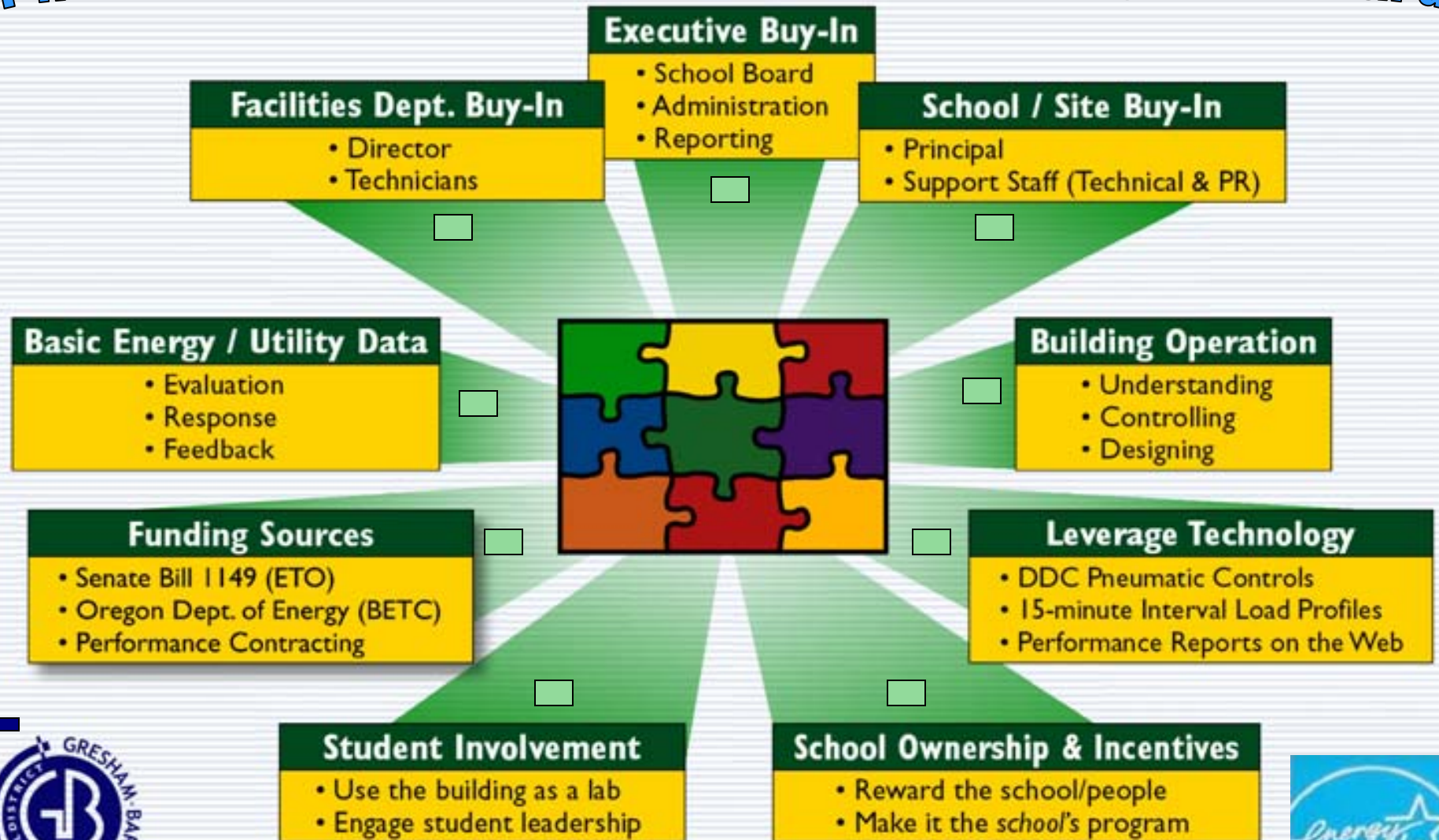
Energy Use Graph - Monthly and Annual Trend for Gresham-Barlow School District



\$4,300,000 Cost avoidance to date
Currently we are at 46% with a goal of 50%

Gresham-Barlow Energy Management Culture

First in the Nation to Receive the EPA's Highest Award



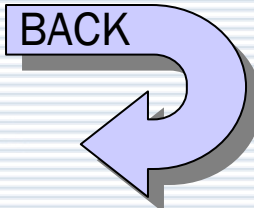


Funding Sources

- Senate Bill 1149 (ETO)
- Oregon Dept. of Energy (BETC)
- Performance Contracting

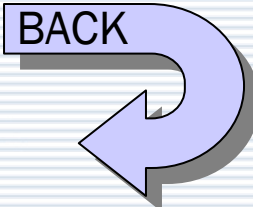


20% to 50% Cost Savings



History

- Started in 1998/99
- Utility bills were just being not managed
- Common denominators for success
 - Data, incentives and student involvement
- Data entry and Data collections at O/M
- Data evaluation and comparison
- Action taken on all data and comparison issues
- Funding assistance for Capital issues
- Training and Indoctrination
- Institutionalized with Board Policy



The Value of Managing Utility Costs

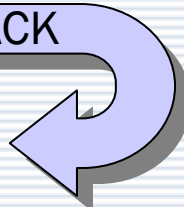
Resource Conservation Management (RCM) for Gresham-Barlow School District

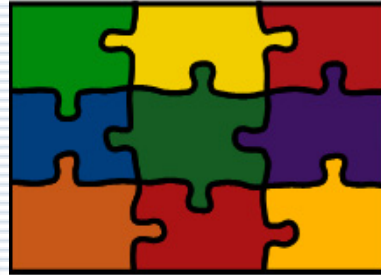
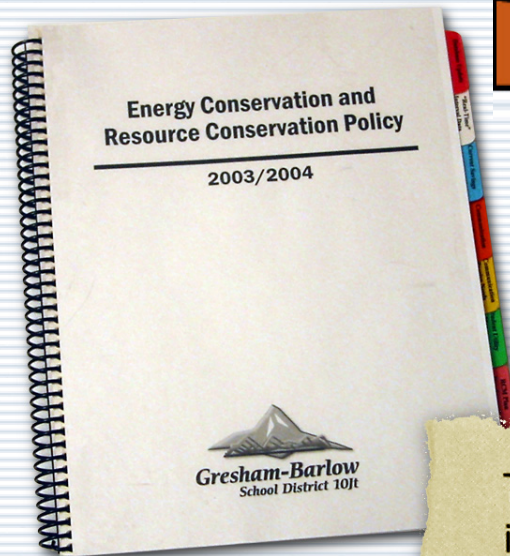
Through effective RCM, the Gresham-Barlow School District avoided **\$870,000** in utility costs for the 2003/2004 school year. This equates to approximately 17 teaching positions. This money has been diverted from paying utility companies so we can spend it on our primary mission: Educating students.

This school year (04/05) we are on track to exceed **\$1,000,000** in savings



BACK





Executive Buy-In

- School Board
- Administration
- Reporting

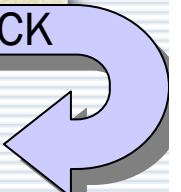
Energy Conservation and Resource Conservation Policy:

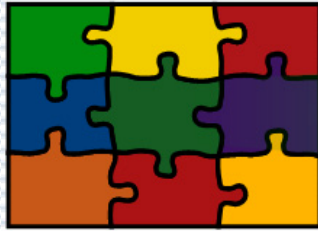
The district encourages and supports the prudent management of its energy resources and utility services, and believes that these should be managed with a focus on conservation as well as education. The district further believes that, to this end, it is the responsibility of each district employee and student to participate in energy and resource conservation whenever possible.

It is the responsibility of district administrators, by way of the direction of the superintendent's office, to implement, direct, monitor, evaluate and report district energy conservation efforts.



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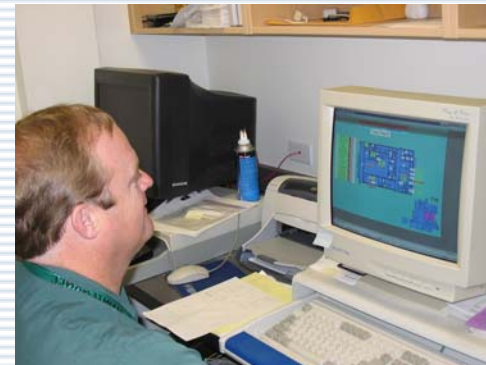
Facilities Dept. Buy-In

- Director
- Technicians



Dave Cone,
“Resource Conservation Manager”

Key Support People



Jim Mathews,
HVAC Technician & DDC Specialist



Suzanne Murphy,
“Data Entry”

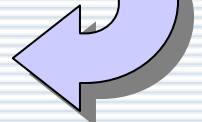


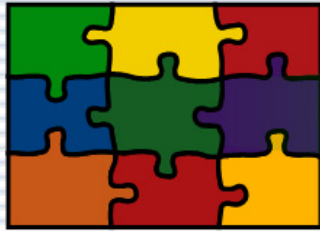
Jim Koehler,
HVAC Technician



**Successful RCM is all about the people
and empowering them to be successful.**

BACK





School / Site Buy-In

- Principal
- Support Staff (Technical & PR)

MBtu per Student			
Hollydale Elem.		District-wide	
6 MBtu	1999	11 MBtu	
4 MBtu	2004	7 MBtu	
33.3% Reduction!		36.4% Reduction!	

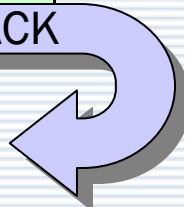


Rod Maynard, Head Custodian at Hollydale Elementary School works with students to save energy.

Site	kBtu/SqFt	Energy Cost/SqFt	Total Energy Cost
Gresham High School	86	\$1.05	\$252,966
Sam Barlow High School	65	\$0.82	\$236,284



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Basic Energy / Utility Data

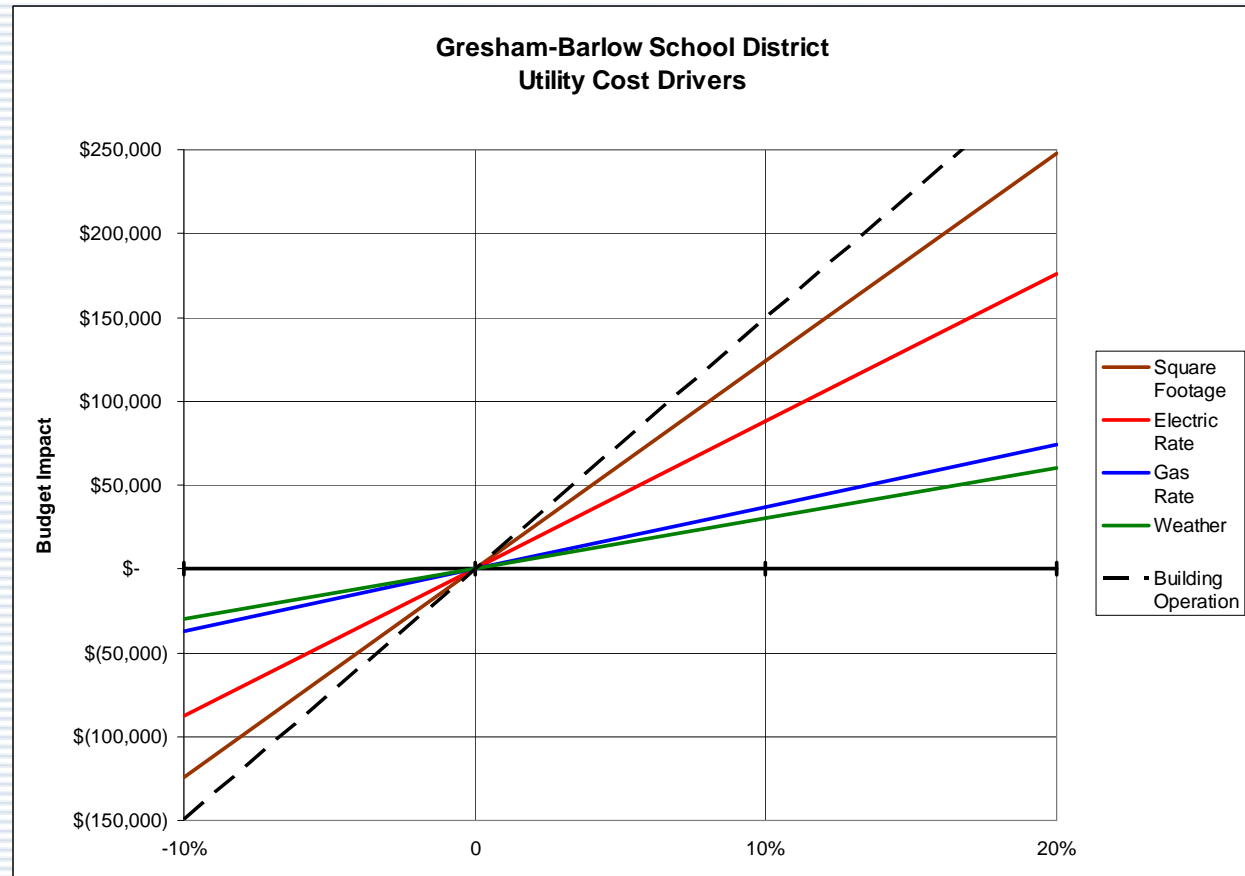
- Evaluation
- Response
- Feedback

Drivers we can't affect:

Square Footage, Utility Rates and Weather

Drivers we can affect:

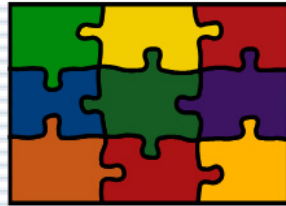
Building Operation



Example of Rate Impact

		Average Cost/Therm per School Year					
Average Annual Cost/Therm	\$0.516	\$0.551	\$0.673	\$0.858	\$0.818	\$0.834	\$0.955
% Increase over Previous Year	21%	7%	22%	27%	-5%	2%	15%
% Increase over Base Year	21%	30%	58%	102%	92%	96%	125%
97-98 Base Year Cost/Therm	\$0.425						

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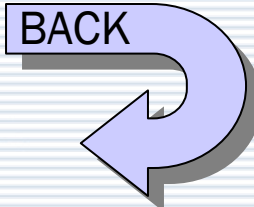
Basic Energy / Utility Data

- Evaluation
- Response
- Feedback

Gresham-Barlow School District (Selected Sites)											
Site Energy Cost Comparison -- Year Ending 04/2004											
Elem. Schools	Electricity Use (kWh)			Nat. Gas Use (Therms)			2002 Costs	Savings	Net Due School		
	Apr-02	Apr-03	Apr-04	Apr-02	Apr-03	Apr-04					
Deep Creek	25,138	21,688	24,000	1,129	1,236	874	\$1,458.23	\$288.07	\$214.11	\$214.11	
East Gresham	29,975	19,216	19,049	1,198	1,133	788	\$1,458.23	\$288.07			
East Orient	18,406	17,302	16,939	2,172	1,870	1,399	\$876.34	\$172.05			
Hall	55,275	52,414	50,080	139	91	89	\$1,076.00	\$66.23			
Highland	49,514	55,034	44,121	1,435	623	611	\$2,946.08	\$452.34			
Hogan Cedars	na	27,247	25,707	na	1081	633	\$2,087.62	\$520.09			
Hollydale	55,011	43,956	48,218	129	72	56	\$2,518.02	\$206.63			
Kelly Creek	35,341	35,309	36,034	1,214	1,202	805	\$1,949.12	\$302.04			
North Gresham	34,282	28,541	29,631	965	994	633	\$1,926.14	\$316.29			
Powell Valley	41,440	31,448	32,442	896	840	577	\$1,784.21	\$213.58			
West Gresham	18,001	18,135	14,276	1,890	1,693	1,042	\$848.76	\$287.08			
Clear Creek	85,074	74,845	77,442	2,775	1,566	1,057	\$10,013.96	\$1,023.22			
Damascus	32,428	29,888	33,634	1,258	1,205	1,219	\$1,451.36	\$92.61			
Gordon Russell	84,658	82,507	77,691	1,597	2,826	1,266	\$5,964.94	\$1,823.03			
Dexter McCarty	66,358	61,806	63,876	2,909	2,267	1,575	\$3,439.76	\$487.48			
West Orient	32,472	33,021	29,024	2,853	2,511	747	\$1,191.05	\$621.89			
Barlow High	216,021	195,478	149,650	16,744	11,976	8,063	\$32,191.66	\$9,456.91			
Gresham High	158,528	127,969	135,381	13,758	10,669	11,053	\$9,462.02	\$401.51			
Springwater	na	14,793	16,131	na	536	501	\$1,402.90	\$15.19			
Shaded areas denote least usage of 3 years represented for both electricity and gas.											
Gresham-Barlow School District											
Energy Use Report -- 05/2002 thru 04/2004											
Date	Electricity (kWh)	% Chg	Demand (kW)	% Chg	Natural Gas (Therms)	% Chg	Total Energy (MBtu)				
05/02	1,118,663	-9.7	4,774	-11.2	35,791	+4.8	7,396.0				
06/02	786,412	-13.1	4,648	-12.8	16,397	-13.4	4,323.0				
Period Total	1,905,075	-11.1	4,774	-11.2	52,189	-1.7	11,719.0				
07/02	809,237	-1.9	4,415	+3.7	11,456	-3.6	3,225.3				
08/02	781,653	+7.6	4,328	-8.6	12,346	+21.6	3,901.6				
09/02	1,060,200	-0.9	4,766	-5.7	15,358	+6.8	5,153.2				
10/02	1,180,020	-2.4	4,831	-6.4	33,753	-13.4	7,401.6				
11/02	1,096,105	-4.9	4,398	-9.7	56,830	-3.8	9,422.9				
12/02	1,051,328	-7.5	3,850	-16.1	70,542	-8.8	10,541.3				
01/03	1,129,932	-6.9	3,817	-16.0	70,876	-17.0	10,942.9				
02/03	1,062,880	-5.1	3,892	-16.4	62,195	-10.0	9,845.1				
03/03	1,028,555	-9.1	3,788	-13.8	58,495	-11.4	9,359.9				
04/03	1,031,814	-6.9	3,602	-18.7	45,628	-16.3	7,981.0				
05/03	984,180	-12.0	4,003	-16.1	29,984	-16.2	6,359.4				
06/03	863,782	-15.6	3,977	-14.4	13,303	-18.9	3,595.2				
Annual Total	11,648,685	-5.8	4,831	-6.4	480,766	-10.8	87,825.3				
07/03	531,160	-12.8	1,093	-75.2	8,375	-27.0	2,649.8				
08/03	740,702	-5.2	4,577	+5.8	9,733	-21.2	3,500.6				
09/03	958,214	-9.6	4,702	-1.3	13,707	-19.8	4,640.1				
10/03	1,100,850	-6.7	4,730	-2.1	32,455	-3.8	7,091.6				
11/03	1,049,893	-4.2	4,546	+3.4	59,450	+4.6	9,526.8				
12/03	1,018,230	-3.1	3,520	-8.6	91,198	+29.3	12,593.0				
01/04	1,073,078	-5.0	3,503	-8.2	82,897	+30.8	12,931.0				
02/04	1,044,151	-1.8	3,605	-7.4	64,930	+4.4	10,055.7				
03/04	980,437	-4.7	3,815	+0.7	50,234	-14.1	8,368.8				
04/04	951,657	-5.0	4,163	+15.6	33,718	-26.1	6,618.9				
YTD Total	9,448,282	-5.5	4,730	-2.1	456,487	+4.3	77,886.3				



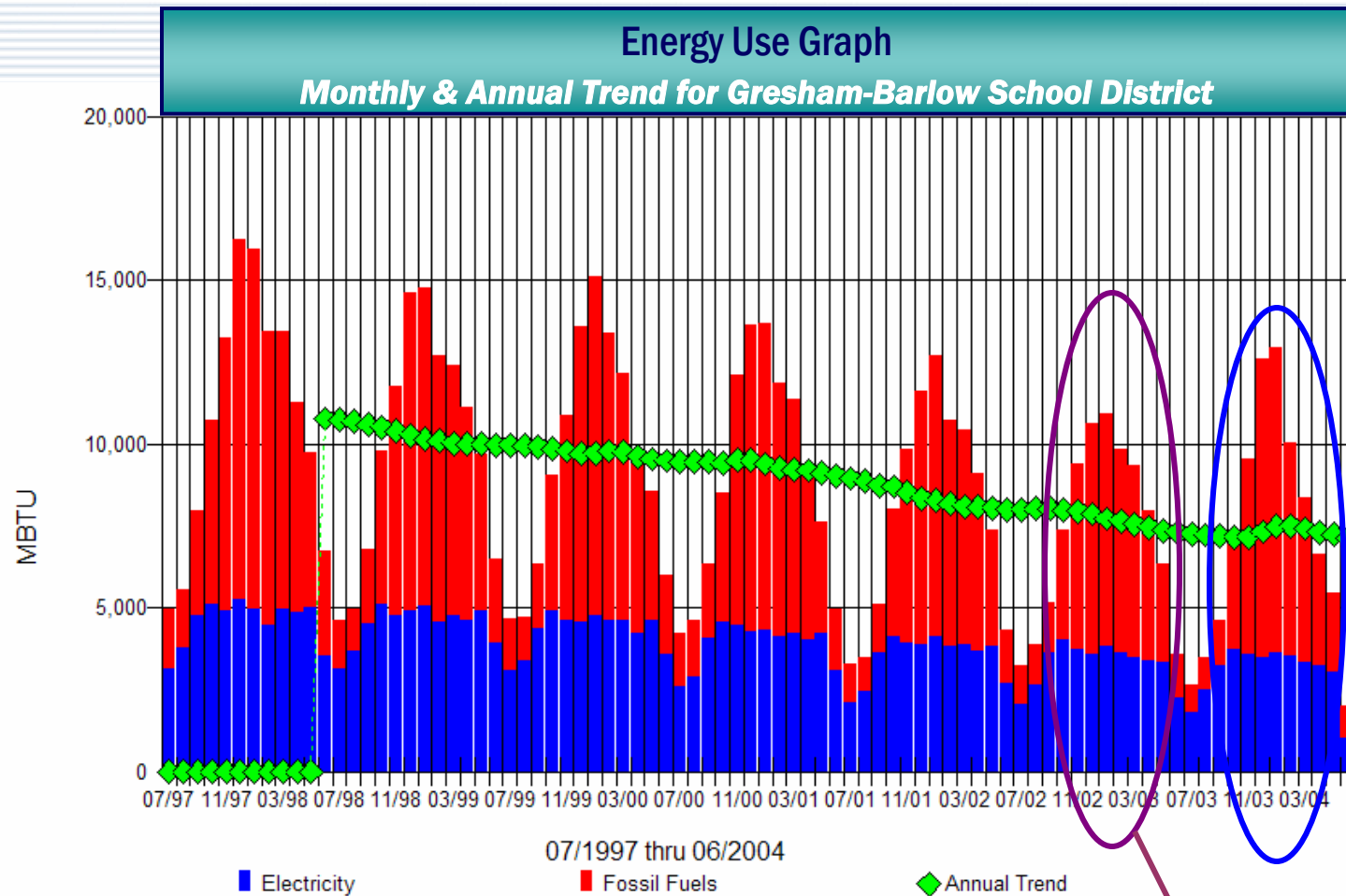
How we use the data for evaluation and response





Basic Energy / Utility Data

- Evaluation
- Response
- Feedback



Weather



11%

Colder

6.5%



Use



One new High School, one new Elementary School and the new O&M Facility came online.

BACK

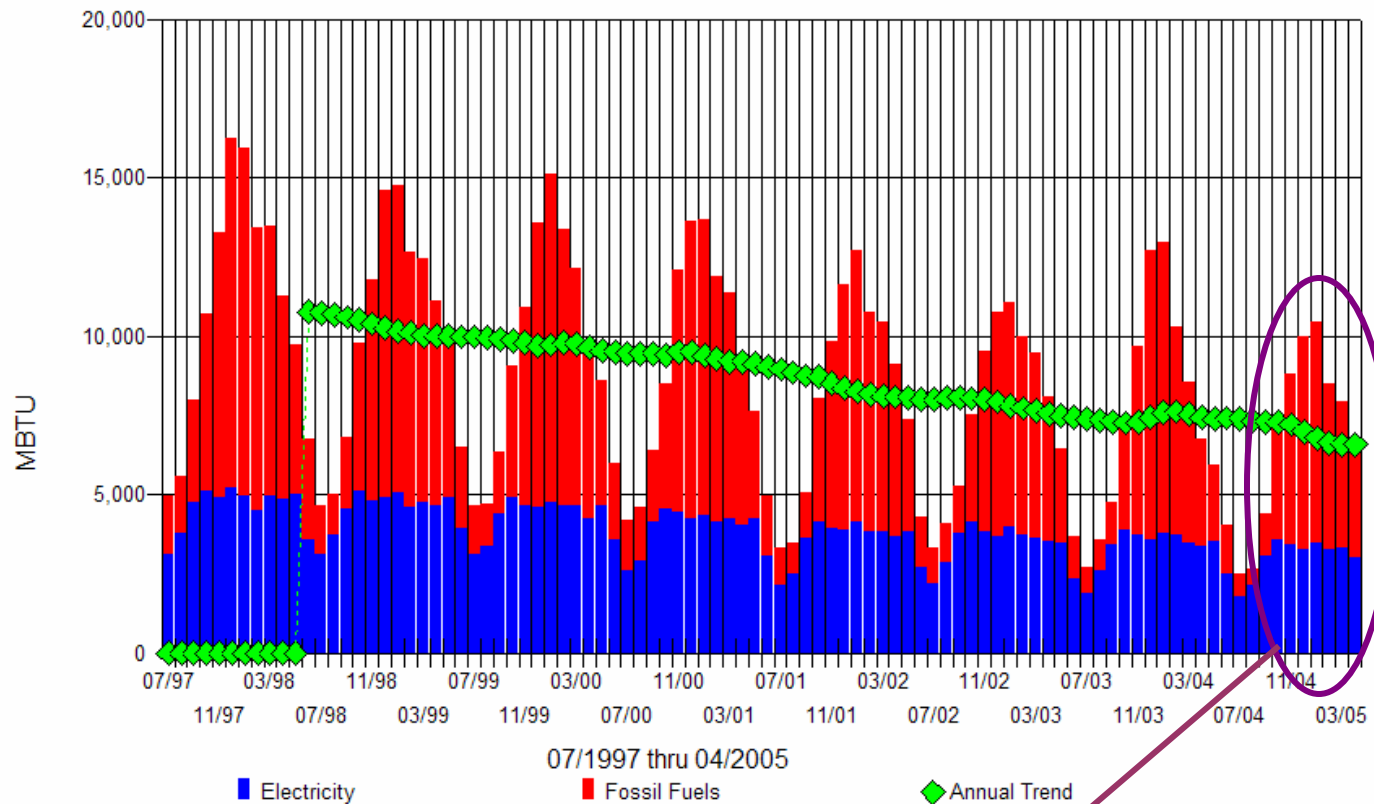




Basic Energy / Utility Data

- Evaluation
- Response
- Feedback

Energy Use Graph - Monthly and Annual Trend for Gresham-Barlow School District



**Performance for this School Year
July 2004 – April 2005**

BACK





Basic Energy / Utility Data

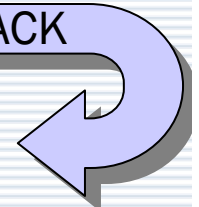
- Evaluation
- Response
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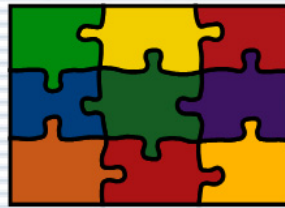
School	kBtu/SqFt/Year with Year Ending February						
	98/99	99/00	00/01	01/02	02/03	03/04	04/05
Sam Barlow High School	118	90	95	88	76	70	53
Gresham High School	110	114	119	98	83	80	73
Kelly Creek Elementary School	84	73	46	42	43	45	39
Clear Creek Middle School	70	72	58	50	50	39	38
Gordon Russell Middle School	67	69	59	52	44	45	37
East Orient Elementary School	67	68	59	55	55	57	55
Dexter McCarty Middle School	65	61	55	50	47	47	44
Highland Elementary School	64	60	59	54	47	46	46
Hall Elementary School	62	54	46	43	37	36	35
North Gresham Elementary School	61	59	57	52	44	49	40
Powell Valley Elementary School	56	48	44	42	37	36	31
Deep Creek Elementary School	54	54	48	40	32	35	34
West Gresham Elementary School	54	56	54	48	52	53	47
West Orient Middle School	53	64	55	42	48	39	28
Hollydale Elementary School	52	55	46	40	36	34	33
East Gresham Elementary School	47	46	41	38	31	31	27
Damascus Middle School	41	46	42	37	34	40	36
Springwater Trail High School	N/A	N/A	N/A	N/A	N/A	53	50
Hogan Cedars Elementary School	N/A	N/A	N/A	N/A	N/A	37	36
Year End Total	73	69	66	58	52	52	45
% Improvement over Previous Year		5%	4%	12%	10%	0%	13%
% Improvement over Base Year	8%	13%	16%	27%	34%	34%	43%



Year to Year Performance for the District using kBtu/SqFt/Year

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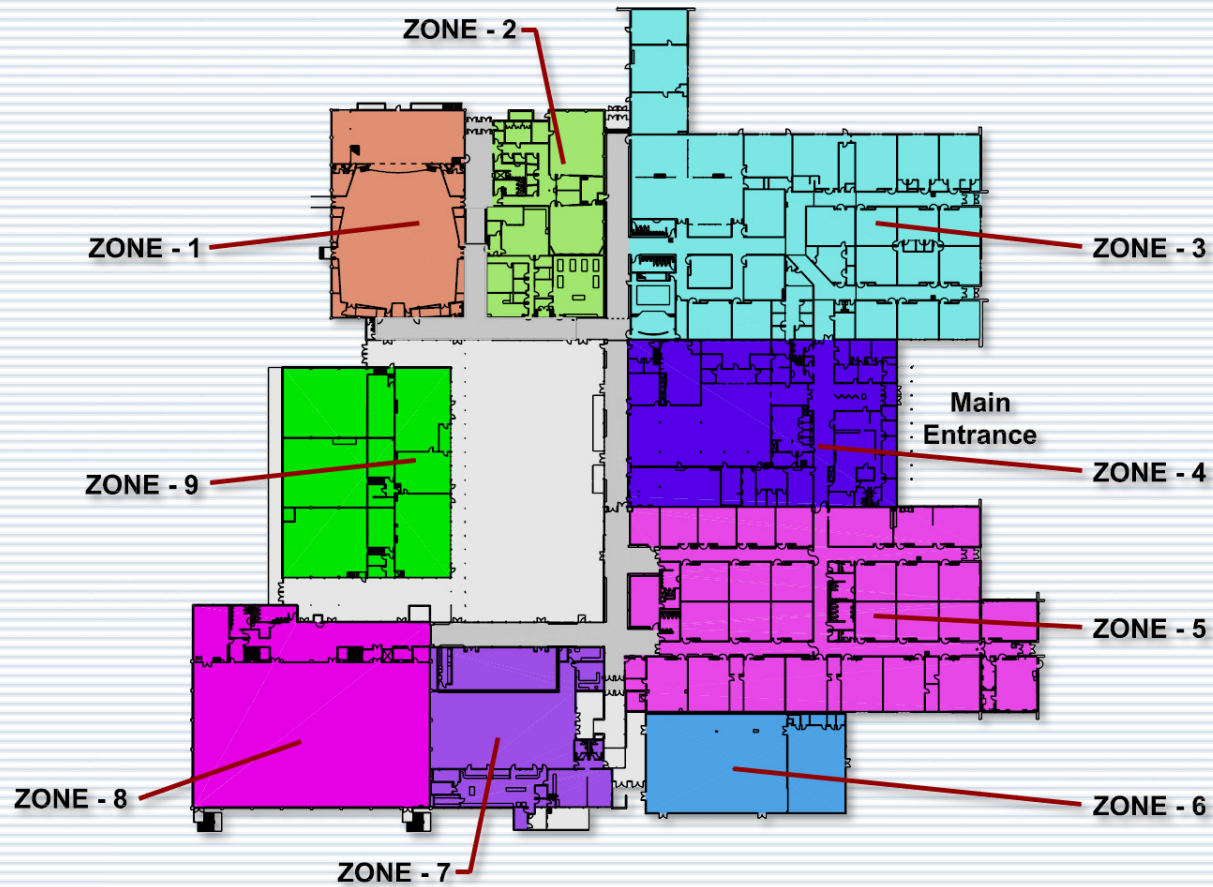




Building Operation

- Understanding
- Controlling
- Designing

HVAC Zone Guide Sam Barlow High School Main Floor Plan



Building
Profile

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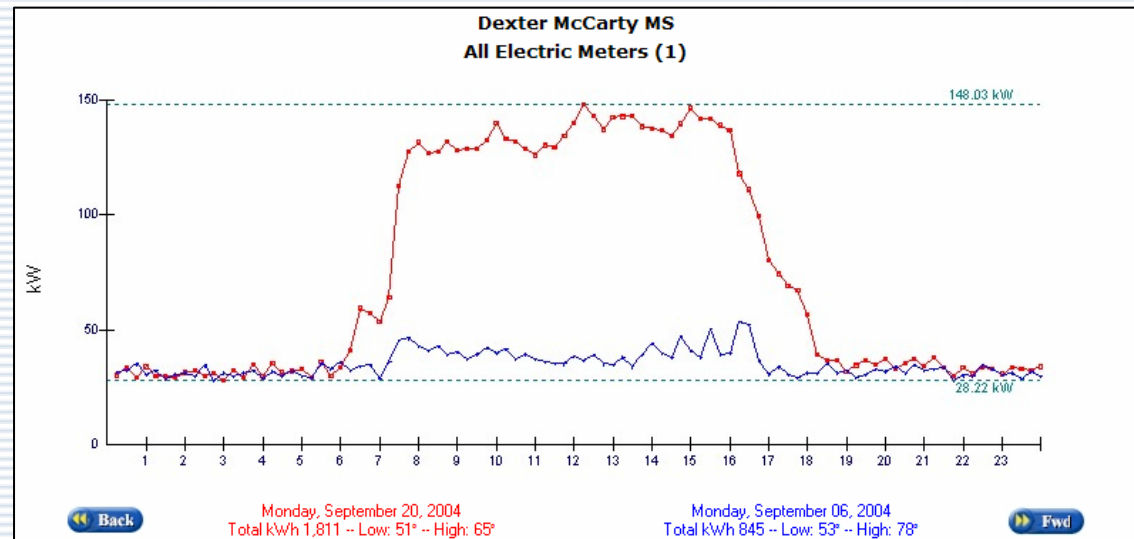




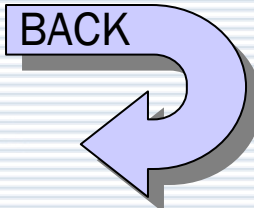
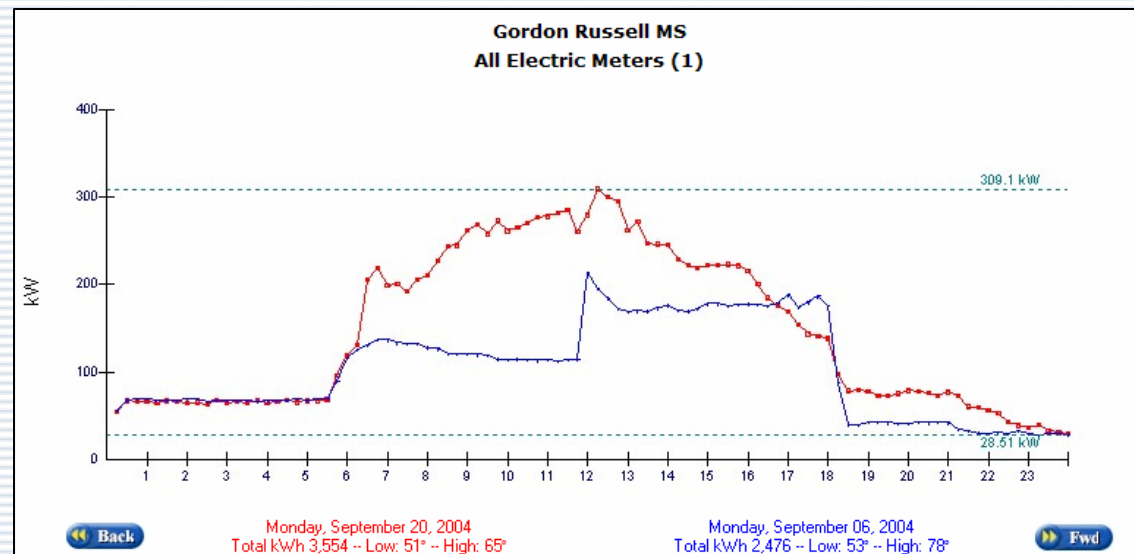
Leverage Technology

- DDC Pneumatic Controls
- 15-minute Interval Load Profiles
- Performance Reports on the Web

**Holiday schedule
operating properly:**



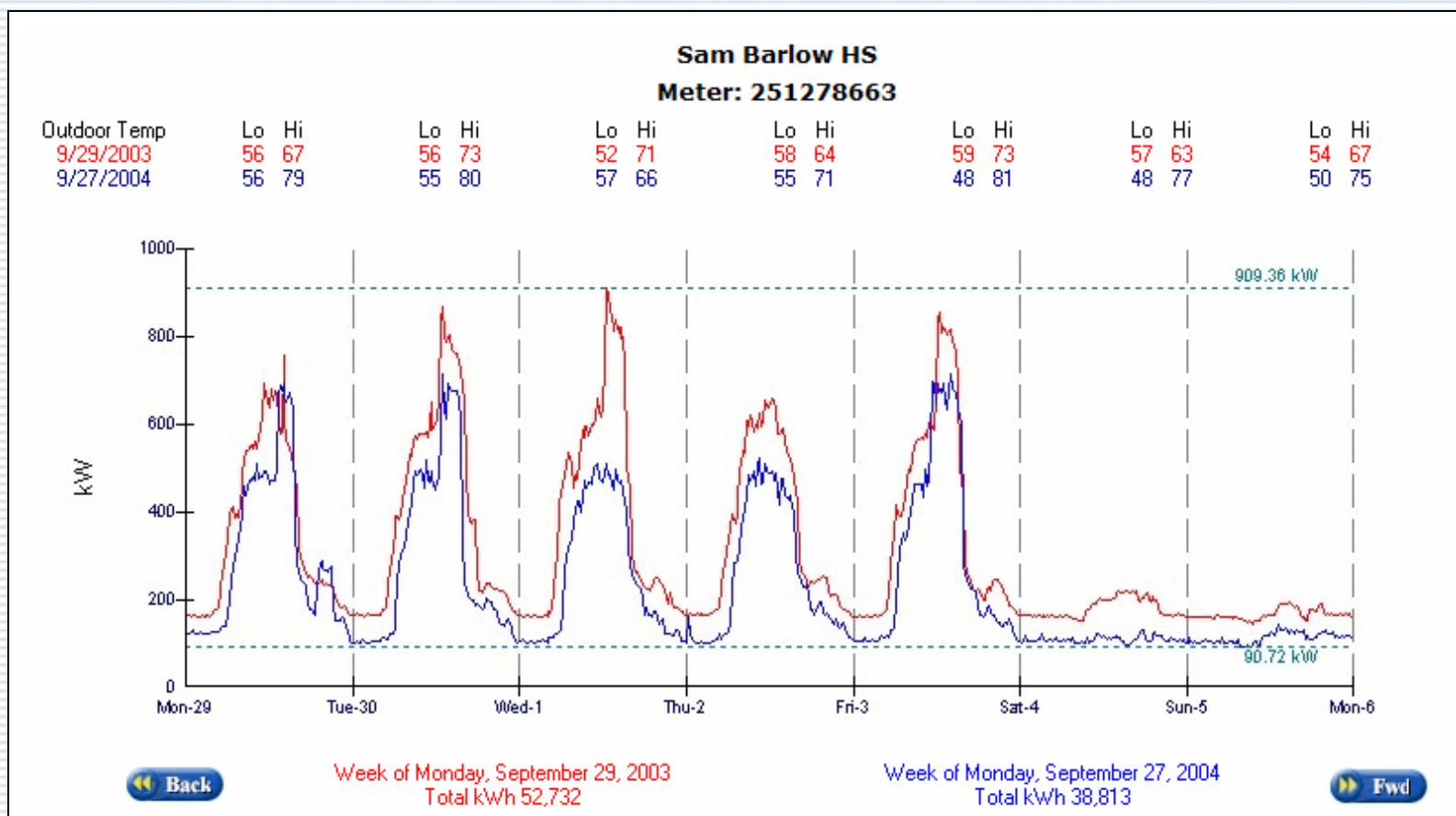
Holiday schedule **NOT
operating properly:**





Building Operation

- Understanding
- Controlling
- Designing



Week of 9/29/03	Week of 9/27/04	Reduction kWh	\$/kWh	Weekly Savings
52,732	38,813	13,919	\$0.075	\$1,043.93
Note: Average daily "high" temperature was 10% higher in 2004 compared to 2003				

BACK



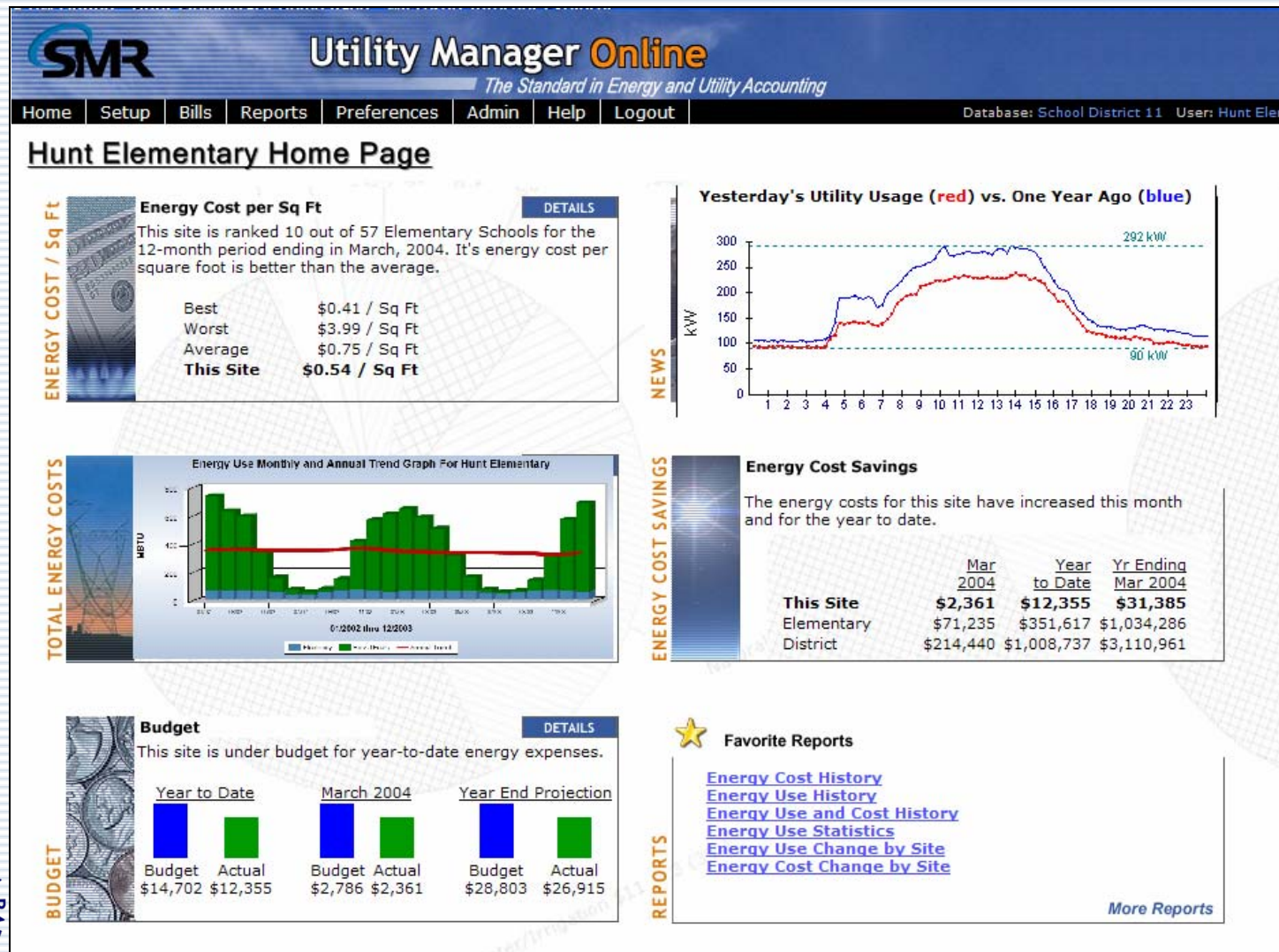
Future Growth:

Providing information
through the web



School Ownership & Incentives

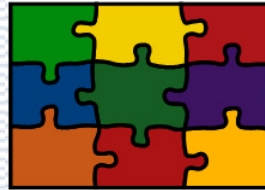
- Reward the school/people
- Make it the school's program



Incentive
program

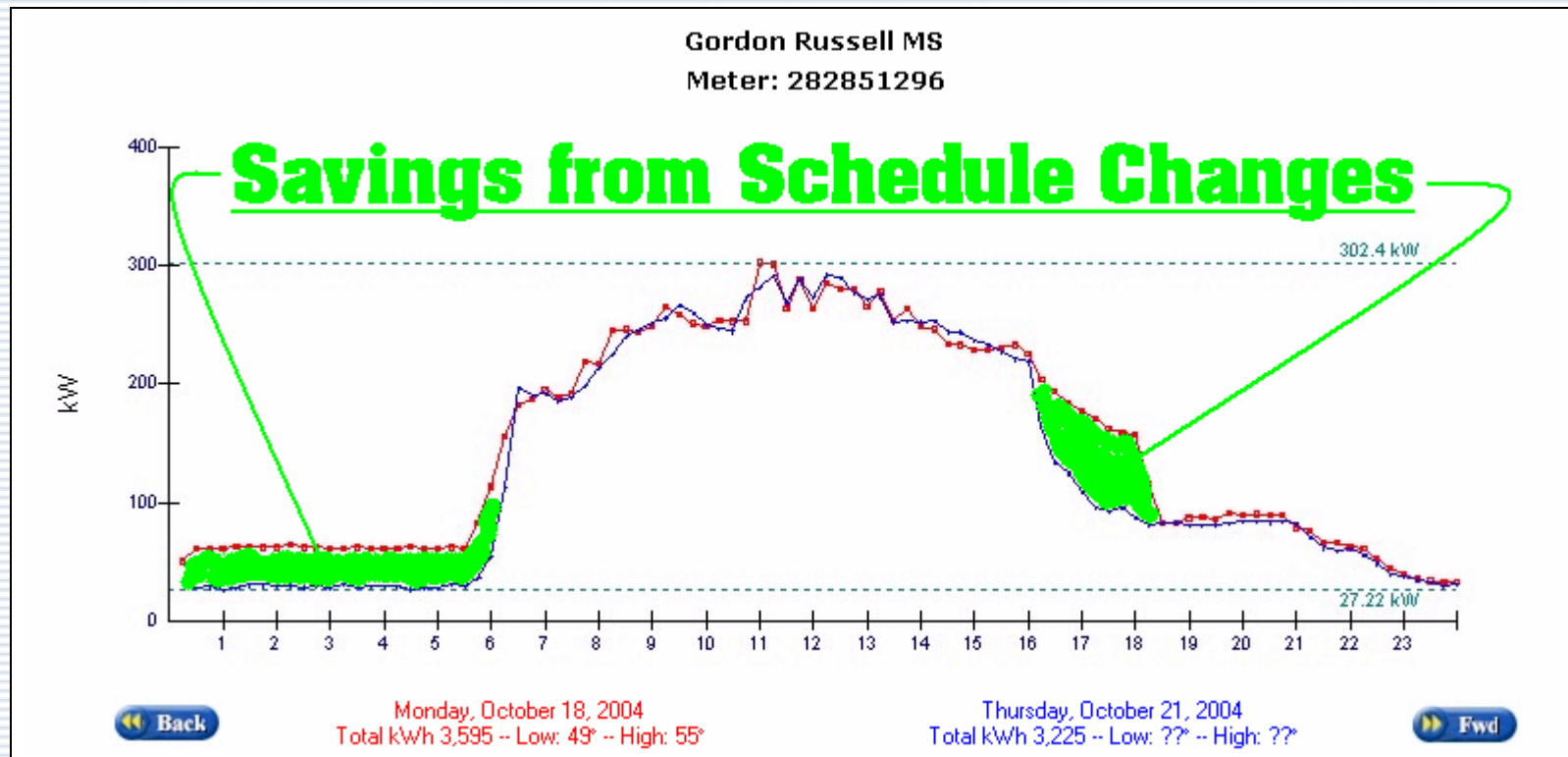
BACK





Leverage Technology

- DDC Pneumatic Controls
- 15-minute Interval Load Profiles
- Performance Reports on the Web



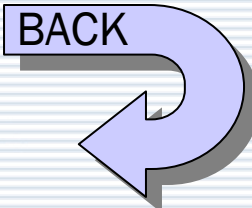
Holiday

Optimum Start (morning): 260 week-days a year (including Holidays) = 148/kWh/day

After School Shutdown: 190 school days a year = 227/kWh/day



Projected Savings = \$6,500/yr





Funding Sources

- Senate Bill 1149 (ETO)
- Oregon Dept. of Energy (BETC)
- Performance Contracting



Oregon Dept. of Energy

Estimated at \$60,000,000 for all participating Districts

Gresham-Barlow receives **\$1,800,000** - 10 years

SB 1149



Oregon Dept. of Energy

Estimated at \$15,300,000 for all participating Districts

Gresham-Barlow receives **\$459,000** - 10 years

**BETC
Passthrough**



Oregon Dept. of Energy

Estimated at \$75,300,000 for all participating Districts

Gresham-Barlow receives **\$2,259,000** - 10 years

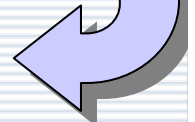
**Total FREE
Dollars
Available**

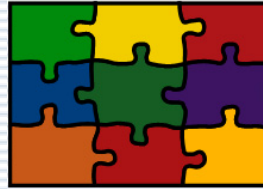
Funding Steps



Projects: Gresham HS, East Orient ES, West Gresham ES

BACK





Funding Sources

- Senate Bill 1149 (ETO)
- Oregon Dept. of Energy (BETC)
- Performance Contracting

Senate Bill 1149:

GBSD funds appropriated and spent for energy efficiency upgrades

12/16/2004	\$13,793.84	\$468,081.00		\$306,609.75
1/19/2005	\$17,191.55	\$485,272.55		\$323,801.29
2/10/2005	\$17,442.77	\$502,715.32	Tech Assist-DOE \$1,527.95	\$339,716.11
3/14/2005	\$15,246.46	\$517,961.78	Energy Retro-fit \$281,366.95	\$73,595.62
4/14/2005	\$14,433.35	\$532,395.13		\$88,028.97

Plus the additional 25.5% funding to Senate Bill 1149 provided through the Oregon Department of Energy's Business Energy Tax Credit (BETC) program

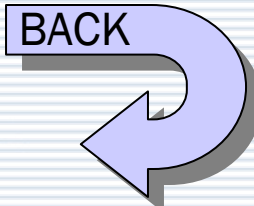
What is your District doing?



10/19/2004	\$8,000.00	\$230,000.00	Tech Assist-DOE \$800.00	\$220,000.00
11/19/2004	\$8,000.00	\$238,000.00	Tech Assist-DOE \$1,300.00	\$226,700.00
12/16/2004	\$7,200.00	\$245,200.00		\$233,900.00
1/19/2005	\$9,000.00	\$254,200.00		\$242,900.00
2/10/2005	\$9,100.00	\$263,300.00	Tech Assist-DOE \$800.00	\$251,200.00
3/14/2005	\$8,000.00	\$271,300.00		\$259,200.00
4/14/2005	\$7,500.00	\$278,800.00		\$266,700.00

Example of a typical District's participation in this funding program:

- One High School
- Three Middle Schools
- Seven Elementary Schools





School Ownership & Incentives

- Reward the school/people
- Make it the school's program

Incentive Distribution for Gresham-Barlow Schools 2004/2005

Total Distribution = \$29,000					
<u>Target Incentive Awards</u>	Elementary	\$1,000			
	Middle	\$2,000			
	High	\$3,000			
Incentive Payout based on:	Participation	Performance	Effort	Total	
	40%	40%	20%	100%	

Participation, Performance, and Effort is applied to these major events for each school:

- Regular School Year Schedule
- Thanksgiving Break
- Winter Break
- Spring Break
- Summer Break



BACK





School Ownership & Incentives

- Reward the school/people
- Make it the school's program

My Portfolio: Gresham-Barlow School District

April 18, 2005 - 05:18:59 PM

Total Buildings: 19

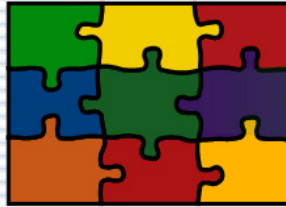
Facility Name	Baseline Period	Current Period	Baseline Rating	Current Rating	Baseline Annual Energy Intensity (kBtu/Sq. Ft.)	Current Annual Energy Intensity (kBtu/Sq. Ft.)
Clear Creek Middle School	12/31/2000	2/28/2005	23	63	60.6	39
Damascus Middle School	12/31/2000	2/28/2005	63	83	44.6	37.8
Deep Creek Elementary School	12/31/2000	2/28/2005	51	86	48.2	34.8
Dexter McCarty Middle School	12/31/2000	2/28/2005	33	58	55.2	45.6
East Gresham Elementary School	12/31/2000	2/28/2005	66	95	41.3	27.9
East Orient Elementary School	12/31/2000	2/28/2005	56	69	59.6	57
Gordon Russell Middle School	12/31/2000	2/28/2005	26	75	57.5	37.9
Gresham High School	7/31/2001	2/28/2005	1	30	96.1	75.9
Hall Elementary School	12/31/2000	2/28/2005	18	48	46.3	35.8
Highland Elementary School	12/31/2000	2/28/2005	17	48	59.1	47.3
Hogan Cedars Elementary School	12/31/2000	2/28/2005	n/a	83	0	36.8
Hollydale Elementary School	12/31/2000	2/28/2005	21	58	44.7	33.6
Kelly Creek Elementary School	12/31/2000	2/28/2005	55	71	47.4	39.9
North Gresham Elementary School	12/31/2000	2/28/2005	40	75	56.7	41.3
Powell Valley Elementary School	12/31/2000	2/28/2005	48	82	44.1	32.4
Sam Barlow High School	12/31/2000	2/28/2005	12	62	94.2	53
Springwater Trail High School	2/28/2003	2/28/2005	61	45	44.5	51.8
West Gresham Elementary School	12/31/2000	2/28/2005	66	79	54.6	48.8
West Orient Middle School	5/31/2002	2/28/2005	2	90	43.4	29.2
Group Total						



Working to achieve Energy Star Certification for all our schools

BACK





Student Involvement

- Use the building as a lab
- Engage student leadership

**Expanding on our
Success by leveraging
proven programs**



JC Penney

TEXT ONLY VERSION

[Welcome To Watt Watchers](#)

[About Watt Watchers](#)

[Elementary & Junior High Schools](#)

[Energy Managers](#)

[A Note For Teachers](#)



Watt Watchers of Texas

Saving Energy in Texas Schools...



*Rod Maynard, Head
Custodian at Hollydale
Elementary School
works with students to
save energy.*



About NEF

Materials Catalog

Programs & Academy

Partners & Sponsors

Character Education

National Energy Foundation

Resources for Education

Educators Students Links Press Room Workshops Debate

EDUCATORS

NATIONAL ENERGY FOUNDATION
is pleased to offer excellent resources
for teachers and administrators.
Check them out!

Catalog

Great energy and environmental teaching materials that can be ordered online!

Workshops

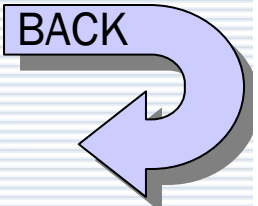
NEF offers teacher training opportunities throughout the country. Locations and details are listed here.

Teacher Activities

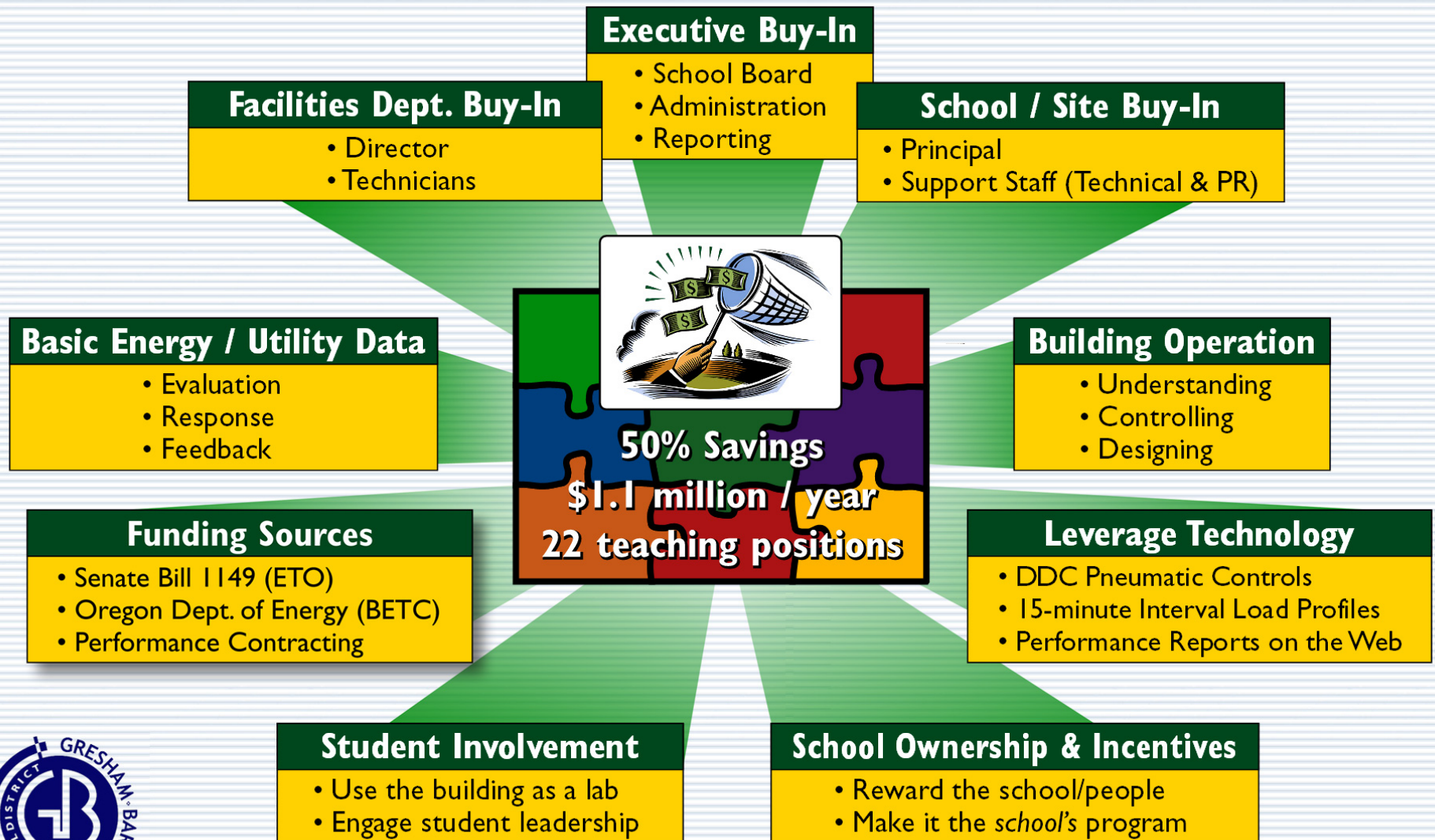
Find professional lesson plans and activities for science education.

Graduate Credit

Earn university graduate credit while teaching in your classroom.



Results of the Comprehensive Solution





A WORLD-CLASS EDUCATION
• FOR ALL STUDENTS •

★ Energy Star Management

Community Leadership

Protecting the
Environment



Participation

Building
Occupants

Operator's
Manual

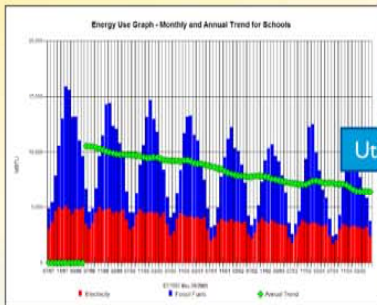


Building
Maintenance
and Operations

Daily Energy
Information

Building
Equipment
and Controls

Monthly
Utility Bills



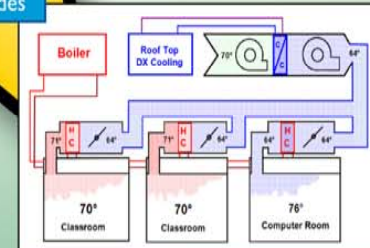
Utility Tracking

Achieving over
40% per year in
Energy Reduction

Achieving over
\$1,000,000 per year
in **Cost Savings**

Real-Time
Management

EMS/DDC
Upgrades

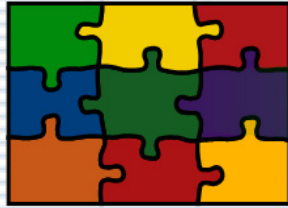


BACK

Thank You!



Gresham-Barlow
School District 10Jt



Student Involvement

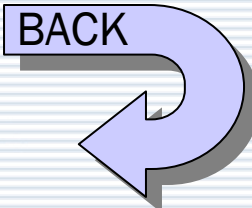
- Use the building as a lab
- Engage student leadership



In partnership with the Center for Advanced Learning (CAL), the district is taking the first step in establishing a new program for students called **Student-to-Energy Tech.**



This program is all about getting the students, under teacher supervision, actively involved in the day-to-day management of the school's energy and water consumption through the active management of the Building Performance Plan.



Building Performance Plan

Communication & Coordination

- School Scheduling
- Temperature Set-Points
- Mechanical System Operations
- Building Weatherization
- Building Cleaning
- Seasonal Initiatives
- Preventative Maintenance



School Ownership & Incentives

- Reward the school/people
- Make it the school's program

School Board

Administration

School

RCM Coordinator

Facilities Dept.

RCM Team

Building Performance Plan

Communication tool for coordinating all activities

Custodial Staff

Office Staff

Teachers

Classroom & Club Participation

SET

Student 2 Energy Tech

Elementary School

BACK





ENERGY STAR COMMUNITY

Join us in building the first Energy Star Community in the nation. Energy Star is an international program focused on practicing energy efficiency in all aspects of life. Gresham-Barlow School District is the first organization in the nation to win the Energy Star Leader Award and is now recognized by the EPA as the most energy efficient organization in the country. Together, let's follow the leadership of our local school district and start saving money, protecting our environment, creating new jobs and establishing a new culture for our community that properly serves our children and becomes a model for our country.

Retain Jobs

Gresham-Barlow School District, the most energy efficient organization in the country, avoided \$1,123,000 in utility cost last year which is equivalent to 22 teaching positions.

Protect Our Environment

Energy Star Management (ESM) is a management practice that focuses on the prudent use of basic resources (electricity, natural gas, water, waste-water, refuse, recycling) while maintaining a positive and healthy working environment.

BACK



Create Jobs

The Center for Advanced Learning (CAL High School) was created to align education with future business requirements. Energy Star Management (ESM) fits perfectly into this model as students participate with professionals in delivering ESM to local businesses.

Educate Our Community

Education is the key to success and who better to educate our community than our local school district. ESM is all about practicing common sense and doing the right thing.

Uniting a community to practice Energy Star Management.



Leadership in our Community

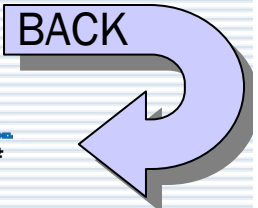


Energy Star Leader



Oregon – Public Sector
Sherwood School District
Clackamas High School
OASBO
COSA

Oregon and Beyond
JC Penney – Northwest Stores
State of Texas



The Bottom-line Performance



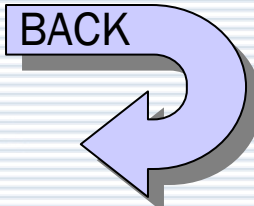
kBtu per Square Foot Performance

School	98/99	99/00	00/01	01/02	02/03	03/04	04/05
Sam Barlow High School	118	90	95	88	76	70	53
Gresham High School	110	114	119	98	83	80	73
Kelly Creek Elementary School	84	73	46	42	43	45	39
Clear Creek Middle School	70	72	58	50	50	39	38
Gordon Russell Middle School	67	69	59	52	44	45	37
East Orient Elementary School	67	68	59	55	55	57	55
Dexter McCarty Middle School	65	61	55	50	47	47	44
Highland Elementary School	64	60	59	54	47	46	46
Hall Elementary School	62	54	46	43	37	36	35
North Gresham Elementary School	61	59	57	52	44	49	40
Powell Valley Elementary School	56	48	44	42	37	36	31
Deep Creek Elementary School	54	54	48	40	32	35	34
West Gresham Elementary School	54	56	54	48	52	53	47
West Orient Middle School	53	64	55	42	48	39	28
Hollydale Elementary School	52	55	46	40	36	34	33
East Gresham Elementary School	47	46	41	38	31	31	27
Damascus Middle School	41	46	42	37	34	40	36
Springwater Trail High School	N/A	N/A	N/A	N/A	N/A	53	50
Hogan Cedars Elementary School	N/A	N/A	N/A	N/A	N/A	37	36
Year End Total	73	69	66	58	52	52	45

Last Year (03/04) = \$870,000 (17 Teachers)

This Year (04/05) = \$1,120,000 (22 Teachers)

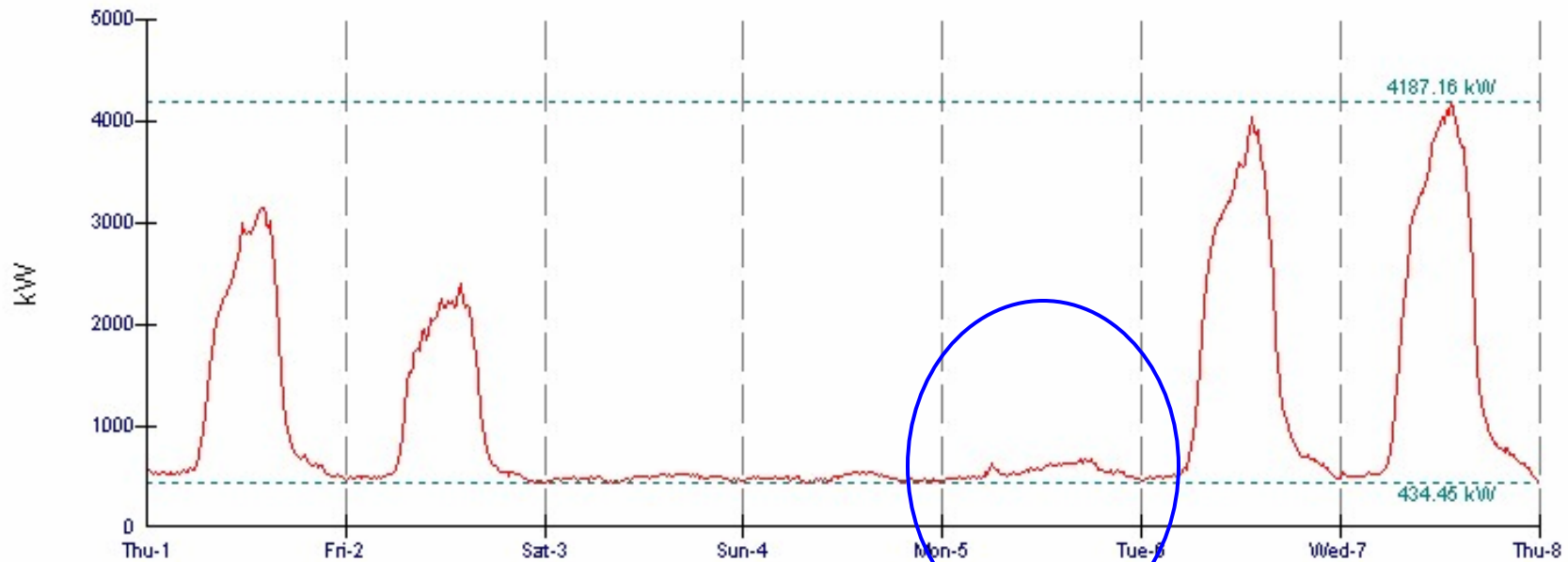
Community
Impact



Better Information Systems: Interval Data

All Sites All Electric Meters (20)

Outdoor Temp	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi
9/1/2005	57	85	58	75	58	75	58	72	53	76	??	??



Back

Week of Thursday, September 01, 2005
Total kWh 177,022

Fwd



Labor Day Holiday - Excellent Performance

BACK

